Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
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Allocation and Authorization of Additional Spectrum for the Fixed-Satellite Service in the 50.4-51.4 GHz and 51.4-52.4 GHz Bands	)	RM-11773
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COMMENTS OF T-MOBILE USA, INC.

T-Mobile USA, Inc. ("T-Mobile")[1/] submits these comments in response to the Public Notice[2/] on The Boeing Company's ("Boeing") Petition for Rulemaking ("Petition"),[3/] which asks that the Commission allocate and authorize additional uplink (Earth-to-space) spectrum for the Fixed-Satellite Service ("FSS") in the 50.4-51.4 GHz and 51.4-52.4 GHz bands. The Commission should not proceed with an independent assessment of the Petition; it is already addressing the very same spectrum in its proceeding evaluating the use of bands above 24 GHz for Fifth Generation ("5G") mobile broadband use.[4/] Instead, the Commission should consider

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1/ T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

2/ Consumer & Governmental Affairs Bureau Information Reference Center Petition for Rulemaking Filed, Public Notice, Report No. 3051 (rel. Sept. 16, 2016).

3/ The Boeing Company Petition for Rulemaking, RM-11773 (filed June 22, 2016).

4/ *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services; Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands; Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band; Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band; Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0- 38.0 GHz and 40.0-40.5 GHz for Government Operations, ("Spectrum Frontiers Proceeding"),*

the future use of the targeted bands in the *Spectrum Frontiers Proceeding,* where Boeing must address how its proposal would be consistent with actions the Commission has proposed and has already taken.

I. INTRODUCTION

T-Mobile, including the MetroPCS brand, offers nationwide wireless voice, text, and data services to approximately 67.4 million subscribers,[5/] and leads growth and innovation in the wireless industry. T-Mobile is consistently improving and expanding its network. Within the space of three years, the footprint for T-Mobile's 4G Long Term Evolution ("LTE") network – the Nation's the fastest growing 4G LTE network – has gone from covering zero to covering approximately 312 million Americans, carrying 55% more data per customer than Verizon.[6/] T-Mobile has deployed Wideband LTE nationwide with 2- and 3-channel carrier aggregation to enhance speeds, and is expanding Extended Range LTE to enhance coverage and in-building performance.[7/] In fact, T-Mobile already launched seven LTE Advanced technologies – more

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Report and Order and Further Notice of Proposed Rulemaking, FCC 16-89 (rel. July 14, 2016) (subparts referred to respectively as the "*Report and Order"* and the *"FNPRM*").

5/ *See* T-Mobile News Release, *T-Mobile Again Delivers Industry-Leading Customer and Financial Results* (July 27, 2016), https://newsroom.t-mobile.com/news-and-blogs/2q-2016-earnings.htm ("T-Mobile July News Release").

6/ *See* T-Mobile News Release, *LTE Advanced is so 2014. We're already on to the next big thing. Verizon is now 50% faster … and still slower than T-Mobile!* (Sept. 6, 2016), https://newsroom.t-mobile.com/news-and-blogs/lte-advanced.htm ("T-Mobile September News Release") (also noting that T-Mobile "now has near parity with the once dominant Verizon coverage, reaching 99.7% of the consumers Verizon does"); *see also* T-Mobile July News Release.

7/ *See* T-Mobile News Release*, 2015 End-of-Year Recap: Taking America's Fastest 4G LTE Even Further* (Dec. 25, 2015), https://newsroom.t-mobile.com/news-and-blogs/2015-end-of-year-network-recap.htm; T-Mobile News Release*, Fact Sheet: The Un-carrier Network* (Aug. 18, 2016), https://newsroom.t-mobile.com/news-and-blogs/t-mobile-links/un-carrier-network-fact-sheet.htm ("T-Mobile Extended Range LTE . . . will soon cover 269 million people or 83% of the U.S. population, including all of the top 10 markets and 29 of the top 30 markets in the U.S. T-Mobile Wideband LTE, which boosts both capacity and data speeds by up to an additional 50%, now covers 224 million people in over 340 markets nationwide.").

than anyone else in the industry.[8/] As a result of these improvements, T-Mobile continues to be the fastest 4G LTE network in the country, based on download speeds from millions of user-generated tests.[9/] And in September 2016, T-Mobile announced the introduction of two more new LTE Advanced technologies that, when combined, can deliver peak download speeds up to 400 Mbps.[10/] Each new technology released improves outcomes for customers and helps set the foundation for 5G wireless services in the future.

T-Mobile's technological innovations also drive growth in its subscriber base. In the second quarter of 2016, T-Mobile added a net 1.9 million customers – marking the thirteenth consecutive quarter that T-Mobile has generated more than 1 million net customer additions.[11/] Further, providing a preliminary view of several key customer results for the third quarter of 2016, T-Mobile announced that as of the first half of September 2016, it had already surpassed second quarter 2016 levels in key subscriber performance metrics.[12/] Since the launch of T-Mobile's first Un-carrier initiative in the first quarter of 2013, T-Mobile has added more than 24 million customers on a pro forma combined basis.[13/]

As the growth described above highlights, identifying new spectrum for the provision of mobile services is vitally important for the wireless industry. Accordingly, T-Mobile has been an active participant for several years in the Commerce Spectrum Management Advisory Committee ("CSMAC") – which advises the National Telecommunications and Information

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8/ *See* T-Mobile September News Release.

9/ *See id*.

10/ *See id.* (announcing the launch of 4x4 multiple input, multiple output ("MIMO") technology; and 256 quadrature amplitude modification ("QAM") for downloads and 64 QAM for uploads).

11/ *See* T-Mobile July News Release.

12/ *See* T-Mobile News Release, *T-Mobile Continues to See Strong Momentum in Q3 2016* (Sept. 20, 2016), http://investor.t-mobile.com/file/Index?KeyFile=35951577.

13/ *See* T-Mobile July News Release.

Administration on spectrum policy issues, including on reforms to make more spectrum available for commercial use – and in particular, T-Mobile has contributed heavily to the work of the CSMAC 5G Subcommittee.[14/] T-Mobile has also successfully negotiated with federal users in AWS-3 spectrum, and will be deploying wireless services using its AWS-3 spectrum licenses by the end of the year.[15/] All of these efforts, and more, are making much needed spectrum available for wireless broadband services, but the demand continues to grow.

Increasing use by consumers of data-intensive applications such as video and Internet access is creating mounting demand for mobile network capacity[16/] – demand that is outpacing available spectrum.[17/] The *Spectrum Frontiers Proceeding* recognizes the role that spectrum above 24 GHz will play in satisfying this demand and the current scarcity of exclusively licensed spectrum in the millimeter wave bands.[18/] In the *FNPRM*, the Commission proposes to authorize fixed and mobile operations in the 50.4-52.6 GHz ("50 GHz") band under the new Part 30 Upper

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[14/] *See, e.g.*, *CSMAC 2015-2016 Assignments*, COMMERCE SPECTRUM MANAGEMENT ADVISORY COMMITTEE (Dec. 1, 2015), https://www.ntia.doc.gov/files/ntia/publications/csmac_2015-2016_assignments_102915.pdf.

[15/] *See* T-Mobile News Release, *T-Mobile Opens LG V20 Pre-Sale with Awesome Deals and is First to Light Up AWS-3 Spectrum* (Oct. 17, 2016), https://newsroom.t-mobile.com/news-and-blogs/lg-v20-pre-sale.htm; *see also* Mike Dano, *T-Mobile to Start AWS-3 Spectrum Buildouts Later This Year, Ahead of AT&T*, FIERCEWIRELESS (Aug. 8, 2016), http://www.fiercewireless.com/wireless/t-mobile-to-start-aws-3-spectrum-buildouts-later-year-ahead-at-t.

[16/] *See* CISCO, CISCO VISUAL NETWORKING INDEX: GLOBAL MOBILE DATA TRAFFIC FORECAST UPDATE, 2015–2020 WHITE PAPER, at 26 (2016), http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.pdf ("Because mobile video content has much higher bit rates than other mobile content types, mobile video will generate much of the mobile traffic growth through 2020.").

[17/] *Why Spectrum is Important to You*, CTIA, http://www.ctia.org/your-wireless-life/how-wireless-works/why-spectrum-is-important-to-you (last visited Oct. 12, 2016).

[18/] *See FNPRM*, ¶¶ 376 (stating with regard to the amount of licensed and unlicensed spectrum made available in the millimeter wave bands that "[i]n view of these relative proportions, [the Commission] believe[s] it is appropriate to make additional licensed spectrum available for flexible use").

Microwave Flexible Use Service rules.[19/] Boeing's Petition for additional FSS uplink spectrum specifies bands wholly contained within the spectrum that is the subject of the *FNPRM*. Accordingly, the Petition should be considered, if at all, within the context of the *FNPRM*. The comments in that proceeding support allocation of the 50 GHz band for mobile terrestrial operations, not satellite use. Boeing must address how its proposal is consistent with the Commission's proposal in the *FNPRM*. Moreover, Boeing must also address how use of the spectrum as targeted by the Petition is consistent with actions the Commission has already taken in the *Report and Order*.

II. THE COMMISSION SHOULD CONSIDER THE BOEING PETITION AS PART OF THE SPECTRUM FRONTIERS PROCEEDING

Currently, there are primary fixed and mobile allocations – without service rules – throughout 50 GHz band. There are also primary non-federal and federal allocations in the band at 50.4-51.4 GHz for earth-to-space satellite and mobile satellite, and this segment has been designated for wireless services.[20/] The 50 GHz band is, however, suitable for terrestrial mobile operations, and has been identified by the World Radio Conference as a candidate band for IMT-2020.[21/] Accordingly, the *FNPRM* seeks comment on proposed mobile service rules for the band. Specifically, the Commission proposes to authorize fixed and mobile operations in the 50 GHz band under the Part 30 rules,[22/] licensed on a PEA basis and in 200 megahertz wide channels, consistent with the recently adopted rules for the 37 and 39 GHz bands.[23/] The Commission should not delay action with regard to the 50 GHz band by conducting a separate,

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19/ *See FNPRM*, ¶ 420.

20/ *See FNPRM*, ¶ 418.

21/ *See FNPRM*, ¶¶ 372-73.

22/ *See FNPRM*, ¶ 420.

23/ *See FNPRM*, ¶ 423.

redundant rulemaking proceeding on Boeing's Petition, and should instead consider Boeing's Petition in the context of the *FNPRM*.

In response to the *FNPRM,* numerous parties expressed support for the deployment of 5G services in the 50 GHz band.[24/] Contrary to Boeing's contentions,[25/] and as T-Mobile previously noted, adjacent EESS (passive) and space research operations are not insurmountable obstacles. As with other bands that have co-channel and adjacent channel federal operations, T-Mobile is confident that protection of federal users is feasible through sharing mechanisms agreed-upon through federal/non-federal cooperative efforts such as the CSMAC.[26/]

In contrast, Boeing's Petition, filed prior to release of the *FNPRM*, does not address at least three important issues regarding potential terrestrial mobile use of this spectrum in any detail – stating briefly that "[t]o the extent IMT systems may be deployed in the 50.4-52.4 GHz band, it may be possible to employ opportunistic spectrum access techniques to avoid potential interference from FSS earth station transmissions."[27/] Given the active consideration of this band for 5G services, the Petition's passing treatment of mobile terrestrial use of the band is insufficient. As CTIA stated and as is echoed by Qualcomm, the "Commission should not

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[24/] *See* Comments of 5G Americas, GN Docket No. 14-177, *et al*., at 4 (filed Sept. 30, 2016) ("5G Americas encourages the Commission to repurpose all of the mmW bands under review in this proceeding for flexible use."); Comments of AT&T, GN Docket No. 14-177, *et al*., at 9 (filed Sept. 30, 2016) ("All of the spectrum bands identified in the *FNPRM* hold potential for 5G networks and services and AT&T supports reallocation and modification of the allocation status of all of the identified bands to render them suitable for 5G licensed services."); Comments of Ericsson, GN Docket No. 14-177, *et al*., at 12 (filed Sept. 30, 2016) ("In addition, the 50.4–52.6 GHz band . . . is worthy of consideration."); Comments of Telecommunications Industry Association, GN Docket No. 14-177, *et al*., at 3 (filed Sept. 30, 2016) ("[T]he five proposed bands from 24 GHz to 53 GHz should be opened to UMFUS services now."); Comments of Qualcomm Incorporated, GN Docket No. 14-177, *et al*., at 11 (filed Sept. 30, 2016) ("Qualcomm supports the FCC proposal to authorize fixed and mobile services in [the 50 GHz] band using geographic licensing on a PEA basis.") ("Qualcomm Comments").

[25/] *See* Petition at 10.

[26/] *See also* Comments of T-Mobile, GN Docket No. 14-177, *et al*., at 18-19 (filed Sept. 30, 2016).

[27/] *See* Petition at 10.

entertain a separate proceeding to authorize additional FSS uplink use without considering the impact on terrestrial services."[28/]

In considering the Petition in the context of the *FNPRM,* Boeing must therefore *first* address, and the Commission must consider, the alleged benefit of dedicating the targeted spectrum for FSS operations, rather than making it primarily available for mobile terrestrial operations. T-Mobile does not question, as Boeing asserts, the need for additional broadband capacity.[29/] However, as Boeing recognizes, providing broadband services by satellite will be impactful to an important, but very limited segment of the population.[30/] The Commission must therefore evaluate whether making the 50 GHz band available for FSS use to serve a limited market segment in a way that forecloses its broader potential deployment is in the public interest.

Second, because the 50 GHz band may be allocated for mobile terrestrial use, the Commission must require Boeing "to demonstrate, with concrete analysis, how the 50 GHz band could be used for satellite uplink services without causing harmful interference to 5G services[,]" and it should include this analysis "as part of the record in the [*Spectrum Frontiers*] proceeding so that the Commission may make a fully informed decision about how to allocate the 50 GHz band."[31/] Boeing's discussion in its comments in response to the *FNPRM* of possible approaches to spectrum sharing and potential interference based on an "initial assessment of its planned

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28/ Comments of CTIA, GN Docket No. 14-177, *et al*., at 13 (filed Sept. 30, 2016) ("CTIA Comments"); *see also* Qualcomm Comments at 11.

29/ *See* Petition at 2.

30/ *See* Petition at 7-8.

31/ *See* CTIA Comments at 13-14; *see also* Qualcomm Comments at 11.

gateway locations" – and for which it did not provide the underlying technical analysis – is an insufficient basis on which to expand satellite use in the band.[32/]

Finally, the Petition is premised on the idea that the 50 GHz band would be paired with other so-called "V Band" spectrum for satellite use."[33/] This no longer accurately reflects the Commission's proposals, as Boeing's comments in response to the *FNPRM* acknowledge.[34/] In the *Report and Order,* the Commission designated the 37.5-40 GHz band for terrestrial operations on a primary basis, making it impossible for there to be the 5 gigahertz of spectrum dedicated to satellite that Boeing's Petition envisions. Moreover, part of the 5 gigahertz of paired spectrum is comprised of the band 42-42.5 GHz, which the Commission is also considering making available in the *FNPRM* for terrestrial use. And, several parties, including T-Mobile, have recommended that the Commission also evaluate the 40-42 GHz band for terrestrial operations. Boeing must therefore address, with specific analysis, how the Commission can grant the relief it seeks in light of the actions the Commission has already taken.

III. CONCLUSION

T-Mobile applauds the Commission's efforts to make more millimeter wave spectrum available for licensed, terrestrial mobile use in the *FNPRM.* The Commission should continue to move swiftly to make such spectrum available and should therefore consider this Petition, if at

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32/ *See* Comments of The Boeing Company, GN Docket No. 14-177, *et al*., at 17-22 (filed Sept. 30, 2016) ("Boeing Comments").

33/ *See* Petition at 2-3. The V-band is usually defined as the spectrum between 40 and 75 GHz. *See IEEE Standard Letter Designations for Radar-Frequency Bands*, *IEEE Std 521-2002*, IEEE (2003). As noted above, the Petition proposes to pair the 50 GHz band with some spectrum in the V band (40-42.5 GHz) and the band 37.5-40 GHz, which is sometimes referred to as the Ka, or Q band. *See id.;* Petition at 1.

34/ *See* Boeing Comments at 23.

all, as part of the *Spectrum Frontiers Proceeding*. In so doing, the Commission must require Boeing to demonstrate how the proposed allocation of the 50 GHz band would be consistent with actions it has already taken and those that it proposes to take.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Radhika U. Bhat, hereby certify that on October 17, 2016 a copy of the foregoing Comments of T-Mobile USA, Inc. was served by first-class mail, postage paid, on each of the following:

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